

S/N 09/965,555PATENTIN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Michele J. Berry

Examiner: Luan Thai

Serial No.: 09/965,555

Group Art Unit: 2827

Filed: September 27, 2001

Docket: 884,548US1

Title: ENCAPSULATION OF PIN SOLDER FOR MAINTAINING ACCURACY IN  
PIN POSITION

Assignee: Intel Corporation

Customer No: 21186

INFORMATION DISCLOSURE STATEMENT**FAX RECEIVED**Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

SEP 09 2005

**OFFICE OF PETITIONS**

In compliance with the duty imposed by 37 C.F.R. § 1.56, and in accordance with 37 C.F.R. §§ 1.97 *et. seq.*, the enclosed materials are brought to the attention of the Examiner for consideration in connection with the above-identified patent application. Applicant respectfully requests that this Information Disclosure Statement be entered and the documents listed on the attached Form 1449 be considered by the Examiner and made of record. Pursuant to the provisions of MPEP 609, Applicant requests that a copy of the 1449 form, initialed as being considered by the Examiner, be returned to the Applicant with the next official communication.

One of the listed documents (U.S. 6,209,196) was discovered as a result of the Written Opinion issued in Applicants' corresponding foreign patent application (PCT/US02/30625). This Written Opinion is also cited on the attached PTO 1449 Form and a copy is enclosed.

Pursuant to 37 C.F.R. §1.97(b), it is believed that no fee or statement is required with the Information Disclosure Statement.

**Best Available Copy**

INFORMATION DISCLOSURE STATEMENT

Serial No :09/965555

Filing Date: September 27, 2001

Title: ENCAPSULATION OF PIN SOLDER FOR MAINTAINING ACCURACY IN PIN POSITION

Assignee: Intel Corporation

Page 2

Dkt: 884.548US1 (INTEL)

The Examiner is invited to contact the Applicant's Representative at the below-listed telephone number if there are any questions regarding this communication.

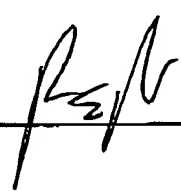
Pursuant to 37 C.F.R. 1.98(a)(2), Applicant believes that copies of cited U.S. Patents and Published Applications are no longer required to be provided to the Office. Notification of this change was provided in the United States Patent and Trademark Office OG Notices dated October 12, 2004. Thus, Applicant has not included copies of any US Patents or Published Applications cited with this submission. Should the Office require copies to be provided, Applicant respectfully requests that notice of such requirement be directed to Applicant's below-signed representative. Applicant acknowledges the requirement to submit copies of foreign patent documents and non-patent literature in accordance with 37 C.F.R. 1.98(a)(2).

Respectfully submitted,

MICHELE J. BERRY

By his Representatives,

SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.  
Attorneys for Intel Corporation  
P.O. Box 2938  
Minneapolis, MN 55402  
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Date 9 September 2005 By   
Robert E. Mates  
Reg. No. 35,271

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Date of Transmission

PTC-506A(10-01)

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|--|--------------------------------|--------------------|
| Substitute for form 1449A/PTO<br><b>INFORMATION DISCLOSURE<br/>STATEMENT BY APPLICANT</b><br>(Use as many sheets as necessary) | Complete if Known              |                    |
|  | Application Number             | 09/965,555         |
|  | Filing Date                    | September 27, 2001 |
|  | First Named Inventor           | Berry, Michele     |
|  | Group Art Unit                 | 2827               |
|  | Examiner Name                  | Thai, Luan         |
| Sheet 1 of 1   | Attorney Docket No: 884.548US1 |                    |

| US PATENT DOCUMENTS |                     |                  |   |                            |
|---------------------|---------------------|------------------|---|----------------------------|
| Examiner Initial *  | USP Document Number | Publication Date | Name of Patentee or Applicant of cited Document | Filing Date if Appropriate |
|                     | US-5,759,730        | 06/02/1998       | Hermansen, R. D., et al.                        | 07/21/1997                 |
|                     | US-6,209,196        | 04/03/2001       | Ozono, , et al.                                 | 01/21/1999                 |

| OTHER DOCUMENTS -- NON PATENT LITERATURE DOCUMENTS |           |   |    |
|--|-----------|---|----|
| Examiner Initials*                                 | Cite No * | Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published. | T* |
|  |           | Written Opinion for PCT/US02/30625  |    |

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EXAMINER

DATE CONSIDERED

Substitute Disclosure Statement Form (PTO-1448)

\* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 600. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. Applicant's unique citation designation number (optional) Applicant is to place a check mark here if English language Translation is attached

## PATENT COOPERATION TREATY

From the  
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITYTo:  
CHARLES E. STEFFEY  
SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P. A.  
P. O. BOX 2938  
MINNEAPOLIS, MN 55402

PCT

WRITTEN OPINION

(PCT Rule 66)

|  |  |   |
|--|--|---|
| Applicant's or agent's file reference  |  | Date of Mailing<br>(day/month/year)                                 |
| 884,548W01   |  | REPLY DUE<br>within 2 months/days from<br>the above date of mailing |
| International application No.  | International filing date (day/month/year) | Priority date (day/month/year)                                      |
| PCT/US02/30625   | 26 September 2002 (26.09.2002)             | 27 September 2001 (27.09.2001)                                      |
| International Patent Classification (IPC) or both national classification and IPC        |  |   |
| IPC(7): H01L 21/44; H01L 23/48, 23/48, 23/52 and US Cl.: 438/61; 3; 257/697, 779, etc. 1 |  |   |
| Applicant  |  |   |
| INTEL CORPORATION  |  |   |

- This written opinion is the first (first, etc.) drawn by this International Preliminary Examining Authority.
- This opinion contains indications relating to the following items:
  - ☒ Basis of the opinion
  - ☐ Priority
  - ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
  - ☐ Lack of unity of invention
  - ☒ Reasoned statement under Rule 66.2 (a)(ii) with regard to novelty, inventive step or industrial applicability, citations and explanations supporting such statement
  - ☐ Certain documents cited
  - ☐ Certain defects in the international application
  - ☐ Certain observations on the international application
- The applicant is hereby invited to reply to this opinion.
 

**When?** See the time limit indicated above. ~~The applicant may, before the expiration of that time limit, request this Authority to grant an extension. See rule 66.2(d).~~

**How?** By submitting a written reply, accompanied, where appropriate, by amendments, according to Rule 66.3. For the form and the language of the amendments, see Rules 66.8 and 66.9.

**Also** For an additional opportunity to submit amendments, see Rule 66.4.  
For the examiner's obligation to consider amendments and/or arguments, see Rule 66.4 bis.  
For an informal communication with the examiner, see Rule 66.6

If no reply is filed, the international preliminary examination report will be established on the basis of this opinion.
- The final date by which the international preliminary examination report must be established according to Rule 69.2 is: 27 January 2004 (27.01.2004).

|   |  |
|---|--|
| Name and mailing address of the IPEA/US<br>Mail Stop PCT, Attn: IPEA/US<br>Commissioner for Patents<br>P.O. Box 1450<br>Alexandria, Virginia 22313-1450<br>Facsimile No. (703) 305-3230 | Authorized officer<br><i>James R. Matthews</i><br>William B. Baumstark<br>Telephone No. (571) 272-1650 |
|---|--|

Form PCT/IPEA/408 (cover sheet)(July 1998)

P408

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## PATENT COOPERATION TREATY

From the  
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITYTo:  
CHARLES E. STEFFBY  
SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P. A.  
P. O. BOX 2938  
MINNEAPOLIS, MN 55402

PCT

WRITTEN OPINION

(PCT Rule 66)

|   |  |                                     |
|---|--|-------------------------------------|
| Applicant's or agent's file reference   |  | Date of Mailing<br>(day/month/year) |
| 884 548W01  |  | 08 JUL 2003                         |
| International application No.   | International filing date (day/month/year) | Priority date (day/month/year)      |
| PCT/US02/30625  | 26 September 2002 (26.09.2002)             | 27 September 2001 (27.09.2001)      |
| International Patent Classification (IPC) or both national classification and IPC       |  |                                     |
| IPC(7): H01L 21/44; H01L 23/48, 23/48, 23/52 and US CL: 438/612, 613; 257/697, 779, 780 |  |                                     |
| Applicant   |  |                                     |
| INTEL CORPORATION   |  |                                     |

- This written opinion is the first (first, etc.) drawn by this International Preliminary Examining Authority.
- This opinion contains indications relating to the following items:
  - ☒ Basis of the opinion
  - ☐ Priority
  - ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
  - ☐ Lack of unity of invention
  - ☒ Reasoned statement under Rule 66.2 (a)(ii) with regard to novelty, inventive step or industrial applicability, citations and explanations supporting such statement
  - ☐ Certain documents cited
  - ☐ Certain defects in the international application
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|   |  |
|---|--|
| Name and mailing address of the IPEA/US<br>Mail Stop PCT, Attn: IPEA/US<br>Commissioner for Patents<br>P.O. Box 1450<br>Alexandria, Virginia 22313-1450<br>Facsimile No. (703) 305-3230 | Authorized officer <i>741</i><br>William B. Baumister <i>James R. Matthews</i><br>Telephone No. (571) 272-1650 |
|---|--|

## WRITTEN OPINION

International application No.

PCT/US02/30625

## I. Basis of the opinion

## 1. With regard to the elements of the international application:\*

- ☒ the international application as originally filed
- ☒ the description:  
pages 1-5 \_\_\_\_\_, as originally filed  
pages NONE \_\_\_\_\_, filed with the demand  
pages NONE \_\_\_\_\_, filed with the letter of \_\_\_\_\_
- ☒ the claims:  
pages 6-8 \_\_\_\_\_, as originally filed  
pages NONE \_\_\_\_\_, as amended (together with any statement) under Article 19  
pages NONE \_\_\_\_\_, filed with the demand  
pages NONE \_\_\_\_\_, filed with the letter of \_\_\_\_\_
- ☒ the drawings:  
pages 1-5 \_\_\_\_\_, as originally filed  
pages NONE \_\_\_\_\_, filed with the demand  
pages NONE \_\_\_\_\_, filed with the letter of \_\_\_\_\_
- ☐ the sequence listing part of the description:  
pages NONE \_\_\_\_\_, as originally filed  
pages NONE \_\_\_\_\_, filed with the demand  
pages NONE \_\_\_\_\_, filed with the letter of \_\_\_\_\_

## 2. With regard to the language, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language \_\_\_\_\_ which is:

- ☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

## 3. With regard to any nucleotide and/or amino acid sequence disclosed in the international application, the written opinion was drawn on the basis of the sequence listing:

- ☐ contained in the international application in printed form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. ☒ The amendments have resulted in the cancellation of:

- ☒ the description, pages None \_\_\_\_\_
- ☒ the claims, Nos. None \_\_\_\_\_
- ☒ the drawings, sheets/fig None \_\_\_\_\_

5. ☐ This opinion has been drawn as if (none of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

\* Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this opinion as "originally filed."

## WRITTEN OPINION

International application No.  
PCT/US02/30625**V. Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. STATEMENT**

|                               |                            |     |
|-------------------------------|----------------------------|-----|
| Novelty (N)                   | Claims <u>1-9, 11</u>      | YES |
|                               | Claims <u>10 and 12-22</u> | NO  |
| Inventive Step (IS)           | Claims <u>1-9</u>          | YES |
|                               | Claims <u>10-22</u>        | NO  |
| Industrial Applicability (IA) | Claims <u>1-22</u>         | YES |
|                               | Claims <u>NONE</u>         | NO  |

**2. CITATIONS AND EXPLANATIONS**

Please See Continuation Sheet

WRITTEN OPINION

International application No.  
PCT/US02/30625

## Supplemental Box

(To be used when the space in any of the preceding boxes is not sufficient)

## TIME LIMIT:

The time limit set for response to a Written Opinion may not be extended, 37 CFR 1.484(d). Any response received after the expiration of the time limit set in the Written Opinion will not be considered in preparing the International Preliminary Examination Report.

## V. 2. Citations and Explanations:

Claims 10 and 12-22 lack novelty under PCT Article 33(2) as being anticipated by Bronson et al. (22 February 1994).

With respect to claim 10, 12-14, 16-19 and 21-22, Bronson et al. disclose (see figure 2, Col. 3, lines 2-43, Col. 7, lines 47-68, Col. 8, lines 1-68, and Col. 9, lines 1-47) a method for use during fabrication of a microelectronic device package, comprising: providing a package substrate (120) having a plurality of contact pads (140) on a surface thereof; attaching pins (170) to the pin contact pads (140) by pin solder reflow (190); and applying a no-flow encapsulation material (e.g., epoxy resin 200) about solder joints associated with the pins (170), to protect the circuitry from the environment. Bronson et al. further disclose a semiconductor die (150) connected to the package substrate (120). Although Bronson et al. do not explicitly teach the semiconductor die (150) having a plurality of bonding pads coupled to the pins through the substrate (120), such bonding pads taken to be inherent in chip 20 since the means of electrically connecting the semiconductor die to the substrate via solder balls (160) is disclosed and it is apparent that some type of bonding pads must be present on the chip surface for solder balls (160) electrically bonding to, and the solder balls (160) are electrically connected to the pins (17) through the substrate (120).

Regarding claims 15 and 20, Bronson et al. do disclose that the epoxy resin (200) is preferred as a resin available under trademark Hysol FP0045 from the Dexter Corporation (Col. 9, lines 11-22), and this epoxy resin is included a polymer material as evidenced by Hermansen et al. (US 5,759,730, Col. 1, lines 44+, Col. 2, lines 14-18, and Col. 2, lines 46+).

Claims 10, 12-14, 16-18 and 21-22 lack novelty under PCT Article 33(2) as being anticipated by Ozono et al. (03 April 2001).

With respect to claim 10, 12-14, 16-19 and 21-22, Ozono et al. disclose (see figures 6A-6B-6C) a method for use during fabrication of a microelectronic device package, comprising: providing a package substrate (21) having a plurality of pin contact pads (22) on a surface thereof; attaching pins (27) to the pin contact pads (22) by pin solder reflow (23); and applying a no-flow encapsulation material (e.g., adhesive resin 4) about solder joints associated with the pins (27), to prevent the movement of the pins when the substrate is subjected to high temperatures. Ozono et al. further disclose a semiconductor die (25) connected to the package substrate (21), wherein the die (25) having bond pads (see figure 6C) that are conductively coupled to the pins (27).

Claims 10 and 12-17 lack novelty under PCT Article 33(2) as being anticipated by Bross et al. (19 April 1994).

With respect to claim 10 and 12-17, Bross et al. disclose (see figure 1B) a method for use during fabrication of a microelectronic device package, comprising: providing a package substrate (5) having a plurality of pin contact pads (6) on a surface thereof; attaching pins (2) to the pin contact pads (6) by pin solder reflow (4); and applying a no-flow encapsulation material (e.g., a polyimide-based material 3) about solder joints associated with the pins (2), to prevent the movement of the pins when the substrate is subjected to high temperatures.

Claim 11 lacks an inventive step under PCT Article 33(3) as being obvious over Bronson et al. (22 February 1994).

Form PCT/PEA/408 (Supplemental Box) (July 1998)



## WRITTEN OPINION

International application No.  
PCT/US02/30625**Supplemental Box**  
(To be used when the space in any of the preceding boxes is not sufficient)

Bronson et al. discloses the claimed invention as detailed above except for using a jig to attach the pins to the substrate.

However, pinning jig is a known tool in the art used to attach conductive pins to a substrate or a chip for soldering or bonding. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the pinning jig to attach the pins to the pin contact pads on the substrate for soldering the pins to the pads, since such tool is conventional in the art to bond the pins to the pads on the substrate.

Claims 1-9 meet the criteria set out in PCT Article 33(2)-(3), because the prior art does not teach or fairly suggest the method steps of applying a polymer material to a surface of the package substrate, attaching pins to the package substrate, through the polymer material, by solder reflow, and these method steps could not easily be conceived of even by a person skilled in the art in the light of the features disclosed in the cited prior arts, such as Bronson et al., wherein Bronson et al. teach the encapsulating material to be applied to the substrate after the step of attaching the pins to the substrate.

Claims 1-22 meet the criteria set out in PCT Article 33(4), and thus claims 1-22 are industrial applicability because the subject matter claimed can be made or used in industry.

## NEW CITATIONS

US 6,209,196 B1 (Ozono et al.) 03 April 2001, see figures 6A-6B-6C, column 5, lines 17-65.

US 5,759,730 (Hermansen et al.) 02 June 1998, column 1, lines 44-45, column 2, lines 14+ and lines 46-50.

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